

REMARKS

I. Status of the Application

Claims 1-42 were filed in the original application. Claims 18-40 were withdrawn from consideration with the Response to Restriction Requirement filed on November 19, 2004. Thus, claims 1-17, 41, and 42 were examined and are the subject of the Office Action. The Examiner withdrew the Species requirement drawn to Figures 2, 3, and 4 and Figures 5, 6, and 7, due to the arguments made in the Response to Restriction Requirement filed on November 19, 2004.

In the Office Action, the Examiner: (1) rejected claims 1-3, 14, 15, 41, and 42 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,767,310 to Reilly et al.; (2) rejected claims 1-9, 12-17, and 41 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,609,572 to Lang; and (3) rejected claims 10-11 under 35 U.S.C. § 103(a) as being unpatentable over Reilly et al. as applied to the claims above, and further in view of Lang. In this response, the Applicants respectfully amend claims 1, 3, 9, 10, 11, 41, and 42.

II. No New Matter Is Introduced by Way of Amendment

Claims 1, 3, 9, 10, 11, 41, and 42 have been amended to clarify that the valves of these claims comprise "pinch valves". The requirement of a pinch valve is supported in the specification at page 1, lines 8-19. Therefore, no new matter has been introduced by way of amendment.

III. The Rejection of Claims 1-3, 14, 15, 41, and 42 Under 35 U.S.C. § 102(b) as Anticipated by Reilly et al. is Overcome

Claims 1-3, 14, 15, 41, and 42 were rejected under 35 U.S.C. § 102(b) as being anticipated by Reilly et al. The Examiner stated that Reilly et al. at Figure 1A and throughout the reference "discloses at least one syringe, at least one fluid reservoir, at least one valve, and at least one catheter that is disposable."

Applicants' Invention

Applicants' invention can be used for the delivery of multiple drugs to a subject, such as a rodent. In addition, Applicants' invention can be used for retraction of blood samples from the same subject. To accomplish these functions, Applicants' invention is composed of few parts, many of which are disposable. These few parts are combined in a manner that drug delivery and/or blood sampling is coordinated, the volume of drugs going through the fluid subsystem is minimized, and the fluid subsystem not contaminated, i.e., the fluid subsystem is sterile.

Applicants' invention uses **disposable tubing** and **pinch valves** in various combinations together with a catheter and syringes (which syringes may also be disposable). With regard to the pinch valves, as stated at Page 8, lines 8-19:

... each of the valves 18, 20, 22, and 24 comprises a two-position, pinch valve with a first and second position that can each open and close. The first and second positions of each of the valves are orifices that receive disposable tubing. The orifices may be slots or other structures that make it easy to place the tubing in each valve without dismantling the fluid subsystem. Because each valve comprises a two-position, pinch valve, the orifice at the first position essentially

comprises a first subvalve and the orifice at the second position essentially comprises a second subvalve. During operation, each valve's first position or second position will be open while the other position will be closed. The first position and second position cannot both be open or both be closed at the same time. While each position of each valve is either referred to as the first or second position, it will be appreciated by one skilled in the art that there is no difference between the two positions."

As stated throughout the specification, there are several advantages to the use of disposable tubing and pinch valves according to the present invention. With pinch valves, the disposable tubing is pinched by the pinch valve – fluid does not flow through the pinch valve, but, rather, flows through the disposable tubing. "Accordingly, fluid remains in the syringes, sterile tubing and fluid reservoirs and does not exit the fluid subsystem or contaminate other components, such as the valves that control the flow of fluid." Page 20, line 23 – Page 21, line 2. "Thus, these embodiments of the present invention can be programmed to deliver a desired volume of fluid from one or multiple syringes into a single catheter without the fluid being exposed to any component which is not a part of either the disposable tubing, tee connectors, y-connectors or syringes that comprise the fluid subsystem." Page 21, lines 17-20. Volume of fluids, such as the drugs, is conserved when pinch valves are used, as the interior of the valve is not filled with fluid. Also, valve types other than pinch valves have the potential to contaminate the fluid – such contamination occurs by the contact of the fluid with the inner workings or interior of the valve. Further, when concerned about cross-contamination of the tubing, the tubing can be replaced, but the pinch valves of Applicants' invention may be reused with new tubing.

The Invention of Reilly et al.

Reilly et al. discloses a system for use to deliver toxic or hazardous substances, such as radiopharmaceuticals, to a patient. To achieve this objective, the invention of Reilly et al. includes a shielded container for holding the toxic or hazardous substance (item 44), an injector (item 20), a syringe (item 60), an a valve system (item 15) and fluid delivery set (item 16) enclosed in a protective container. The valve system of Reilly et al. includes a stopcock (item 30) having three ports -- "a first port 32 that is in fluid connection with saline syringe 20" (Col. 8, lines 57-58), a "second port 34 ... in fluid connection with source 40" (Col. 8, lines 58-59), and a "third port 36 ... in fluid connection with, for example, a dual check valve 50" (Col. 9, lines 1-2). The dual check valve 50 is "in fluid connection with syringe 60" (Col. 9, line 4) and "in fluid connection with patient fluid path set 80" (Col. 9, line 7). The valve system also includes one-way check valve 110 which provides fluid connection between the patient fluid path set and check valve 50 (Col. 9, lines 11-14). Further, one-way check valve 140 of the valve system provides fluid connection between bypass tubing 120 and check valve 110 (Col. 9, lines 23-25).

The system of Reilly et al. provides "purging of air from the entirety of fluid delivery set 15 (and preferably, also from fluid path set 80) before connection of fluid delivery set 15 to pharmaceutical source 40." Col. 9, lines 41-45. In addition, the saline syringe 20 is "used to purge air from system 10" and to "flush to patient fluid path set 80 after injection of pharmaceutical(s)" (Col. 10, lines 9-11).

Because the invention of Reilly et al. is used with toxic or hazardous substances, the fluid delivery set "is preferably disposable after one or more used to, for example, reduce the risk of cross-contamination between patients." Col. 11, lines 9-11. Fluid delivery set 15 includes valve system 16. Col. 8, lines 35-36. Thus, it is anticipated that, in use of the system of Reilly et al., the valves that comprise the valve system (stopcock 30, dual check valve 50, one-way check valve 110, and one-way check valve 140) are disposed of after a single user or a very limited number of uses.

Claim 1 Is Not Anticipated by Reilly et al.

Applicants' claim 1, as amended, clarifies the use of "at least one pinch valve, each pinch valve having a first position and a second position, wherein the second position receives one of the at least one disposable tubes therethrough". As previously described, pinch valves operate by pinching tubing, and, thus, the tubing passes through a pinch valve – tubing is not cut and then the cut portions connected to the pinch valve as is required with other types of valves. Thus, claim 1 requires that the "second position [of the pinch valve] receives one of the at least one disposable tubes **therethrough**". The pinch valve of Applicants' invention is not in fluid connection with the fluid flowing through the tubing.

As previously discussed herein, Reilly et al. discloses the use of a stopcock having ports and check valves. Each of the type of valves used in Reilly et al. have fluid flowing through the valve (referred to as "in fluid connection" throughout the specification of Reilly et al.), and do not comprise a pinch valve. Also, the valves of Reilly et al. cannot receive a tube therethrough as required in Applicants' invention. As discussed above, the use of valves through which fluid

flows results in several disadvantages. First, the valves of Reilly et al. may contaminate the fluid flowing therethrough. Second, when concerned about cross-contamination of the fluid system, the valves of Reilly et al. must be replaced. Third, in Reilly et al. significantly more fluid must flow through the portion of the system containing the valves as the interior of the valves must also be filled with such fluid.

Because Reilly et al. does not disclose, teach, or suggest the use of pinch valves having tubing passing therethrough, it is respectfully submitted that claim 1, as amended, is allowable, and the rejection of claim 1 as anticipated by Reilly et al. under 35 U.S.C. § 102(b) is overcome.

Claims 2, 3, 14, and 15 Are Not Anticipated by Reilly et al.

Because claims 2, 3, 14, and 15 depend from and include all the limitations of claim 1, as amended, it is respectfully submitted that claims 2, 3, 14, and 15 are allowable, and the rejection of claims 2, 3, 14, and 15 as being anticipated by Reilly et al. under 35 U.S.C. § 102(b) is overcome.

Claims 41 and 42 are Not Anticipated by Reilly et al.

Claim 41 requires "at least one pinch valve that has a first position and a second position, wherein the first position receives the at least one syringe inlet therethrough and the second position receives one of the at least one disposable tubes therethrough". Thus, according to claim 41, "at least one syringe inlet" passes through the pinch valve, and "one of the at least one disposable tubes" passes through the pinch valve. Claim 42 requires "a first pinch valve and a second pinch valve, wherein the first pinch valve has a first position that receives the at

least one syringe inlet therethrough and has a second position that receives one of the at least one disposable tubes therethrough, and wherein the second pinch valve has a first position that receives the catheter outlet therethrough and has a second position that receives the waste outlet therethrough". Thus, according to claim 42, a syringe inlet and disposable tube pass through the first pinch valve, and the catheter outlet and waste outlet pass through the second pinch valve. For the reasons set forth above for claim 1 with regard to the requirement of **pinch valves** in Applicants' invention and such pinch valves permitting tubes to pass therethrough, it is respectfully submitted that claims 41 and 42 are patentable, and the rejection of claims 41 and 42 as anticipated by Reilly et al. under 35 U.S.C. § 102(b) is overcome.

IV. The Rejection of Claims 1-9, 12-17, and 41 Under 35 U.S.C. § 102(b) as Anticipated by Lang is Overcome

Claims 1-9, 12-17, and 41 were rejected under 35 U.S.C. § 102(b) as being anticipated by Lang. The Examiner stated that Lang at Figures 7A and 9 and throughout the reference "discloses at least one syringe, at least one fluid reservoir, at least one valve, and at least one catheter that is disposable, as well as multiple syringes, valves, fluid reservoirs, and syringe pumps and wherein the configuration is the same as the applicant's invention."

The Invention of Lang

Lang discloses an infusion system for delivery of multiple drugs to a subject. To accomplish this objective, Lang uses a combination of cassettes for connection to infusion lines, inlet valves, liquid distributions ducts, pump chambers, outlet valves, venting filters and

chambers. The inlet and outlet valves of Lang comprise electropneumatically operating valves, or may "be modified for purely electrical or hybrid electromechanical and pneumatic operation. In this respect for instance the electromagnets or pneumatic cylinders will act via plungers, the inlet and outlet valves and the pump chambers may be evacuated by an plunger advanced by an electric stepper motor in accordance with a program, for instance in a large number of small steps or in a few large ones in a pulsating manner with the outlet valve opened." Col. 9, lines 4-12. As shown in detail in the figures, and, in particular, in Fig. 3, the valves are of the type that the valves are filled with fluid. As stated at Col. 6, lines 21-25, during operation of the system of Lang, "Valves, ducts and chambers of the infusion distribution cassette and of the infusion pump cassette A 2 and of the connected and infusion hose are now filled with the infusion solution free of air bubbles prior to connection with the patient."

Claim 1 is Not Anticipated by Lang

Applicants' claim 1, as amended, clarifies the use of "**at least one pinch valve**, each pinch valve having a first position and a second position, wherein the second position receives one of the at least one disposable tubes therethrough". As previously described, pinch valves operate by pinching tubing, and, thus, the tubing passes through a pinch valve – tubing is not cut and then the cut portions connected to the pinch valve as is required with other types of valves. Thus, claim 1 requires that the "second position [of the pinch valve] receives one of the at least one disposable tubes **therethrough**". The pinch valve of Applicants' invention is not in fluid connection with the fluid flowing through the tubing.

Lang discloses a system in which the valves are in fluid connection with the tubing. Whether the system of Lang is an electropneumatic, or electric, hybrid electromechanical, and pneumatic design, the chambers of the valves are filled with fluid. As previously stated, use of valves through which fluid flows has several shortcomings. A considerably large volume of fluid is required to flow through the fluid subsystem because the dead volume within the interior of the valves must be filled. The interiors of such valves have the potential to contaminate the fluid flowing therethrough. In addition, to truly eliminate any contamination in the fluid subsystem, the interiors of the valves would need to be sterilized or the valves replaced with sterile valves.

Lang is illustrative of another shortcoming addressed by the present invention. For delivery of multiple fluids to a subject and where the fluids are not to be mixed, either because the fluids are incompatible or because they are to distinctly separated in delivery time, valves that fill with fluid, such as in the system of Lang, must be flushed with a wash solution between delivery of the fluids. Such wash solution is generally delivered to the subject. The pinch valves of the present invention are advantageous in that less wash solution is required as there is no need to fill the valve with wash solution, and, thus, less wash solution is delivered to the subject. Less wash solution delivered to the subject is particularly important for small subjects for which the total amount of fluids to be delivered to the subject is necessarily limited.

Applicants' claim 1, as amended, requires the use of pinch valves. Pinch valves are not in fluid connection with the fluid subsystem. Instead, tubing passes through the pinch valve and such tubing is pinched by the pinch valve. Accordingly, the pinch valves of Applicants'

invention do not consume dead volume of fluid, do not contaminate the fluid, and do not have to be replaced or sterilized to avoid contamination of the fluid.

Because Lang does not disclose, teach, or suggest the use of pinch valves, it is respectfully submitted that claim 1, as amended, is allowable, and the rejection of claim 1 as anticipated by Lang under 35 U.S.C. § 102(b) is overcome.

Claims 2-9 and 12-17 Are Not Anticipated by Lang

Because claims 2-9 and 12-17 depend from and include all the limitations of claim 1, as amended, it is respectfully submitted that claims 2-3 and 12-17 are allowable, and the rejection of claims 2-9 and 12-17 under 35 U.S.C. § 102(b) as being anticipated by Lang is overcome.

Claim 41 Is Not Anticipated by Lang

Claim 41 requires "**at least one pinch valve** that has a first position and a second position, wherein the first position receives the at least one syringe inlet therethrough and the second position receives one of the at least one disposable tubes therethrough". Thus, according to claim 41, "at least one syringe inlet" passes through the pinch valve, and "one of the at least one disposable tubes" passes through the pinch valve. For the reasons set forth above for claim 1 with regard to the requirement of **pinch valves** in Applicants' invention and such pinch valves permitting tubes to pass therethrough, it is respectfully submitted that claim 41 is patentable, and the rejection of claims 41 and 42 as anticipated by Lang under 35 U.S.C. § 102(b) is overcome.

V. The Rejection of Claims 10 and 11 Under 35 U.S.C. § 103(a) as Unpatentable over Reilly et al. in View of Lang is Overcome

Claims 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Reilly et al. in view of Lang. The Examiner stated that Reilly et al. does not disclose multiple syringes with multiple valves associated with each syringe, but that Lang does disclose multiple syringes and multiple valves, and that "it would have been obvious to one of ordinary skill in the art to combine the devices of Reilly et al. with the teachings of Lang because Lang discloses the benefit of having multiple syringes with multiple valves to allow better regulation and control of many different types of medication, especially medication that are incompatible infusion solutions (column 2, lines 17-30)."

To combine references, there must be a motivation or suggestion to combine the references. To establish a prima facie case of obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of skill in the art, to modify the reference or to combine reference teachings." MPEP § 706.02(j). "The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor has done. 'To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.'" MPEP § 706.21(j), quoting from *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (B.Pat.App. & Inter. 1985).

Respectfully, the Examiner did not provide such motivation or suggestion. The system of Reilly et al. is specifically directed toward delivery of a single toxic or hazardous drug. Such a drug must be kept apart from any other substance, and, thus, Reilly et al. takes special precautions for such isolation – including isolation of the fluid subsystem from any other substance. The system of Lang, on the other hand, discloses a system for handling many drugs – the fluid subsystem of which will have more than one drug flowing therethrough. Respectfully, there is nothing in Reilly et al. to suggest a system for delivery of multiple toxic or hazardous drugs, and there is nothing in Lang to suggest a system for delivery of toxic or hazardous drugs. Therefore, it is inappropriate to combine Reilly et al. and Lang as suggested by the Examiner.

Without regard to whether it is appropriate to combine Reilly et al. and Lang, neither Reilly et al. nor Lang, alone or in combination, suggest the use of **pinch valves** as required in Applicants' invention. Specifically, claim 1, as amended, and upon which claims 10 and 11 depend, require **pinch valves**, as do claims 10, as amended, and claim 11, as amended. As previously discussed herein, pinch valves provide several advantages. Thus, respectfully, the absence of any disclosure, teaching, or suggestion in either Reilly et al. or Lang, alone or in combination, means that claims 10 and 11, as amended, are patentable, and the rejection of claims 10 and 11 under 35 U.S.C. § 103(a) as unpatentable over Reilly et al. in view of Lang is overcome.

NO FEE FOR CLAIMS AS AMENDED

As originally filed, the application contained five (5) independent claims and 42 total claims, and payment was made for five (5) independent claims and 42 total claims. As amended,

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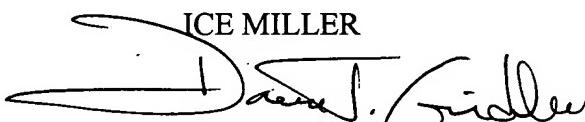
the application contains three (3) independent claims and 19 total claims. Thus, it is believed that no additional fee is required.

CONCLUSION

For all the foregoing reasons, it is respectfully submitted that the Applicants have made a patentable contribution to the art and that this response places the above-identified application in condition for allowance. Favorable reconsideration and allowance of this application is respectfully requested.

In the event the Applicants have inadvertently overlooked the need for an extension of time or payment of an additional fee, the Applicants conditionally petition therefor, and authorize any fee deficiency to be charged to deposit account 09-0007.

Sincerely,


ICE MILLER
Doreen J. Gridley
Attorney Registration No. 35,467
ICE MILLER
One American Square, Box 82001
Indianapolis, Indiana 46282-0200
Telephone: (317) 236-2472
Facsimile: (317) 592-4665

Date: 10/26/05

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